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Expert Opinion Article

"A Cross-Sectional Study on the Impact of COVID-19 on Mental Health Among Health Care Workers"

Dr. Poojitha K. Reddy[1*], Dr. Cherukumudi Pradyumna[2], Dr. Madhu G. Vamsi[3], Dr. Azra fatima[4], Dr. Ashish Appani[5], Dr. Kacham M. Ravali[6], Dr. Suresh K. Reddy[7], Dr. Amulya Arremsetty[8]

[1*]Department of Psychiatry, Assistant professor, Ayaan institute of medical sciences, Hyderabad, India Email: kondareddypooja@icloud.com
[2]Assistant Professor, Department of Psychiatry, Malla Reddy Medical College for Women, Hyderabad, India Email: pradyu26@gmail.com
[3]Founder & Chief Psychiatrist, MV Health, Hyderabad, India Email: madhu.vamsi19@gmail.com
[4]Assistant Professor, Department of Psychiatry, government Medical College and Hospital ,Narayanpet .Email: azrapsychiatry2020@gmail.com
[5]Medical Intern, Government Medical College, Nizamabad, India Email: appaniashish1@gmail.com
[6]Medical Intern, Malla Reddy Medical College for Women, Hyderabad, India Email: mrkacham1@gmail.com
[7]Professor, Department of Psychiatry, Malla Reddy Medical College for Women, Hyderabad, India Email: drsureshimh@gmail.com
[8]Junior Resident, Department of Psychiatry, Malla Reddy Medical College for Women, Hyderabad, India Email: amulya95@gmail.com

Abstract

Background

The COVID-19 pandemic has significantly impacted the mental health of healthcare workers (HCWs) globally, leading to increased rates of stress, anxiety, and depression. Understanding these impacts is crucial for developing targeted interventions and support systems.

Objective

To assess the prevalence of mental health issues among healthcare workers during the COVID-19 pandemic and identify associated risk factors using validated psychological assessment tools.

Methods

A cross-sectional study was conducted among 200 healthcare workers from a tertiary care hospital. Mental health assessment was performed using the Depression, Anxiety and Stress Scale-21 (DASS-21) and Perceived Stress Scale (PSS). Demographic and COVID-19 exposure data were collected through structured questionnaires.

Results

The study revealed significant mental health challenges with stress being the most prevalent condition (59% by DASS-21, 57% by PSS), followed by anxiety (54%) and depression (35%). Female healthcare workers demonstrated higher mental health risks across all parameters. Nurses exhibited elevated risk levels compared to doctors and medical administrators. Age groups 20-25 years and 46+ years showed higher vulnerability. COVID-19 exposure history significantly impacted mental health outcomes.

Conclusion

Healthcare workers experienced substantial mental health burden during the COVID-19 pandemic, with specific demographic and professional groups at higher risk. These findings emphasize the urgent need for targeted psychological interventions and support systems for healthcare personnel.

Keywords: COVID-19, healthcare workers, mental health, stress, anxiety, depression, DASS-21

Introduction

The Coronavirus Disease 2019 (COVID-19) pandemic has fundamentally challenged healthcare systems worldwide, placing unprecedented psychological burden on healthcare workers (HCWs). As frontline responders, healthcare personnel have faced increased exposure to infectious disease, heightened workloads, and concerns about personal safety and transmission to family members. These stressors have created a perfect storm for mental health deterioration among healthcare professionals.

Systematic reviews and meta-analyses have consistently demonstrated elevated rates of psychological distress among healthcare workers during the pandemic. A comprehensive meta-analysis of 161 studies involving 341,014 healthcare workers worldwide found that 47% reported job burnout, 38% experienced anxiety, 34% reported depression, and 30% had acute stress disorder during the pandemic. These rates significantly exceed those typically observed in the general population, highlighting the unique vulnerability of

healthcare workers during public health emergencies.

The psychological impact varies significantly across different healthcare professional groups. Multiple studies have identified nurses as being at particularly high risk for adverse mental health outcomes, with some research indicating that nurses experience greater levels of COVID-19 exposure, infection rates, COVID-related fear, moral injury, and post-traumatic distress compared to other healthcare professionals. Female healthcare workers have also been consistently identified as having higher rates of psychological distress, with women being nearly twice as likely as men to experience depression, anxiety, and PTSD symptoms during the pandemic.

Age-related differences in mental health outcomes have been observed, with younger healthcare workers generally reporting higher levels of stress, anxiety, and depression. This pattern may reflect less professional experience, greater family responsibilities, or increased vulnerability to fear and uncertainty during crisis situations.

The reliability and validity of psychological assessment tools in healthcare populations has been well-established. The Depression, Anxiety and Stress Scale-21 (DASS-21) has demonstrated excellent psychometric properties in healthcare worker populations, with studies confirming its validity and reliability across diverse cultural contexts. The scale provides independent assessment of three related but distinct constructs: depression, anxiety, and stress, making it particularly suitable for comprehensive mental health evaluation in clinical populations.

Despite extensive global research on this topic, there remains a need for detailed analysis of mental health patterns among healthcare workers, particularly studies that provide comprehensive demographic breakdowns and utilize multiple validated assessment tools. Understanding these patterns is essential for developing targeted interventions and support systems for healthcare personnel.

Methods

Study Rationale and Objectives

While numerous studies have documented the general impact of COVID-19 on healthcare worker mental health, there is a need for detailed analysis that examines specific demographic and professional risk patterns. This study aims to provide a comprehensive assessment of mental health outcomes among healthcare workers, with particular attention to demographic variations and professional category differences.

The primary objective of this study was to determine the prevalence of stress, anxiety, and depression among healthcare workers during the COVID-19 pandemic using validated assessment tools. Secondary objectives included identifying demographic and professional risk factors associated with adverse mental health outcomes and examining the relationship between COVID-19 exposure history and psychological distress levels.

Study Design and Setting

This cross-sectional observational study was conducted at a tertiary care hospital between March and June 2021, during the peak of the COVID-19 pandemic's second wave. The study protocol was approved by the Institutional Ethics Committee, and all participants provided informed consent prior to participation.

Study Population

The study population comprised healthcare workers actively involved in patient care during the COVID-19 pandemic. Inclusion criteria were: (1) healthcare professionals aged 18 years and above, (2) direct involvement in patient care for at least 6 months during the pandemic, and (3) voluntary consent to participate. Exclusion criteria included healthcare workers on extended leave during the study period and those with pre-existing psychiatric disorders requiring active treatment.

Sample Size Calculation

Sample size was calculated using the formula for cross-sectional studies with an expected prevalence of mental health issues of 40% based on previous literature, a margin of error of 5%, and a confidence level of 95%. The calculated minimum sample size was 184, which was increased to 200 to account for potential non-response.

Data Collection Instruments

Demographic and Professional Questionnaire

A structured questionnaire was developed to collect demographic information including age, gender, marital status, professional category (doctor, nurse, medical administrator), years of experience, and COVID-19 exposure history (personal infection, family infection, family deaths due to COVID-19).

Depression, Anxiety and Stress Scale-21 (DASS-21)

The DASS-21 is a validated self-report instrument that measures three related negative emotional states: depression, anxiety, and stress. Each subscale contains 7 items rated on a 4-point Likert scale (0-3). Scores are doubled to provide compatibility with the DASS-42. Severity categories for each subscale are: Normal, Mild, Moderate, Severe, and Extremely Severe. The DASS-21 has demonstrated excellent reliability in healthcare populations (Cronbach's $\alpha > 0.90$).

Perceived Stress Scale (PSS)
The 10-item Perceived Stress Scale was used to measure the degree to which situations in life are appraised as stressful. Items are rated on a 5-point scale (0-4), with higher scores indicating greater perceived stress. The PSS has shown good reliability and validity in healthcare worker populations.

Data Collection Procedure
Data collection was conducted through both online and paper-based surveys to maximize participation rates. Healthcare workers were approached during shift changes and break periods. The survey was administered anonymously to ensure confidentiality and encourage honest responses. Participants were given adequate time to complete all questionnaires, with an average completion time of 15-20 minutes.

Statistical Analysis
Data analysis was performed using SPSS version 26.0. Descriptive statistics were calculated for demographic variables and presented as frequencies and percentages for categorical variables, and means with standard deviations for continuous variables. Chi-square tests were used to examine associations between categorical variables and mental health outcomes. Independent t-tests and ANOVA were employed to compare mean scores across different groups. Logistic regression analysis was planned to identify significant predictors of mental health outcomes. Statistical significance was set at $p < 0.05$.

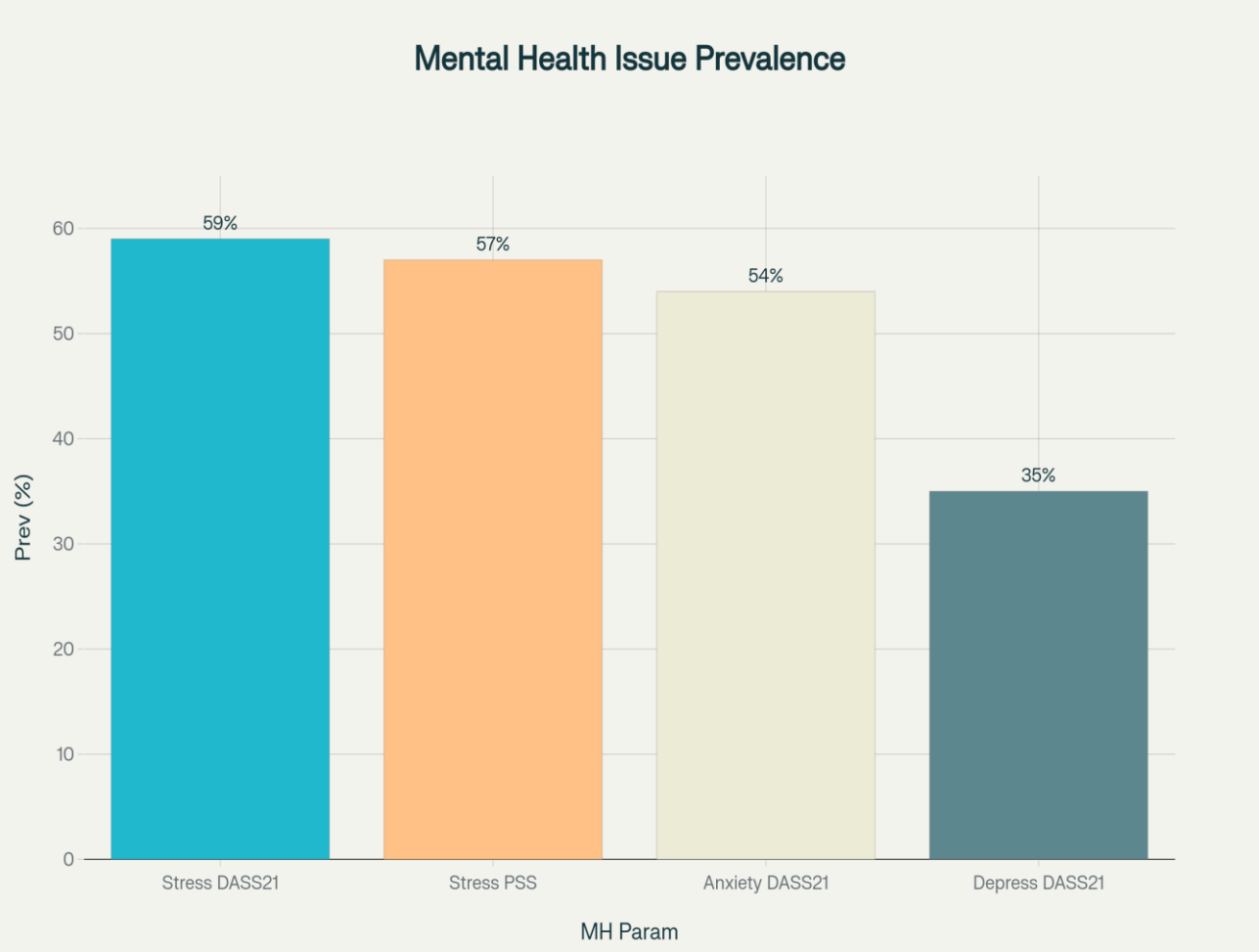
Ethical Considerations
The study was conducted in accordance with the Declaration of Helsinki and received approval from the Institutional Review Board. Participants were informed about the study objectives, voluntary nature of participation, and confidentiality of responses. No personal identifiers were collected, and all data were stored securely. Participants showing severe psychological distress were provided with information about available mental health resources.

Results
Socio-Demographic Profile
The study included 200 healthcare workers from a tertiary care hospital, with detailed demographic characteristics presented in **Table 1**. The largest age group was 20-25 years (34.5%, n=69), followed by 31-35 years (25.0%, n=50). Female participants comprised 54% (n=108) of the sample, while males constituted 46% (n=92). Healthcare professionals were predominantly doctors (71%, n=142) and nurses (24.5%, n=49), with medical administrators representing 4.5% (n=9) of the sample.

Table 1: Socio-Demographic Characteristics of Healthcare Workers (N=200)

Characteristic	Category	Frequency	Percentage
Age Groups	20-25 years	69	34.5
	26-30 years	39	19.5
	31-35 years	50	25.0
	36-40 years	18	9.0
	41-45 years	12	6.0
	46-50 years	7	3.5
	51-55 years	5	2.5
Sex	Male	92	46.0
	Female	108	54.0
Profession	Doctor	142	71.0
	Medical Admin	9	4.5
	Nurse	49	24.5
Marital Status	Divorced	7	3.5
	Married	93	46.5
	Unmarried	100	50.0
COVID-19 Exposure	Personal Isolation	61	30.5
	Family COVID History	21	10.5
	Family Death from COVID	4	2.0

Mental Health Prevalence Overview
The comprehensive analysis revealed significant mental health challenges among healthcare workers during the COVID-19 pandemic. **Table 6** presents the overall prevalence of mental health issues, demonstrating that stress was the most prevalent condition, affecting 59% of participants when measured by DASS-21 scale and 57% by Perceived Stress Scale.



Prevalence of Mental Health Issues Among Healthcare Workers During COVID-19 Pandemic (N=200)

Table 6: Summary of Mental Health Prevalence Among Healthcare Workers

Mental Health Parameter	Total Affected (n)	Prevalence (%)	Mild/Low (%)	Moderate (%)	Severe/High (%)	Extremely Severe (%)
Stress (DASS-21)	118	59.0	38.5	11.0	7.5	2.0
Stress (PSS)	114	57.0	43.0	46.5	10.5	0.0
Anxiety (DASS-21)	108	54.0	10.0	25.5	8.0	10.5
Depression (DASS-21)	70	35.0	24.0	0.5	10.5	0.0

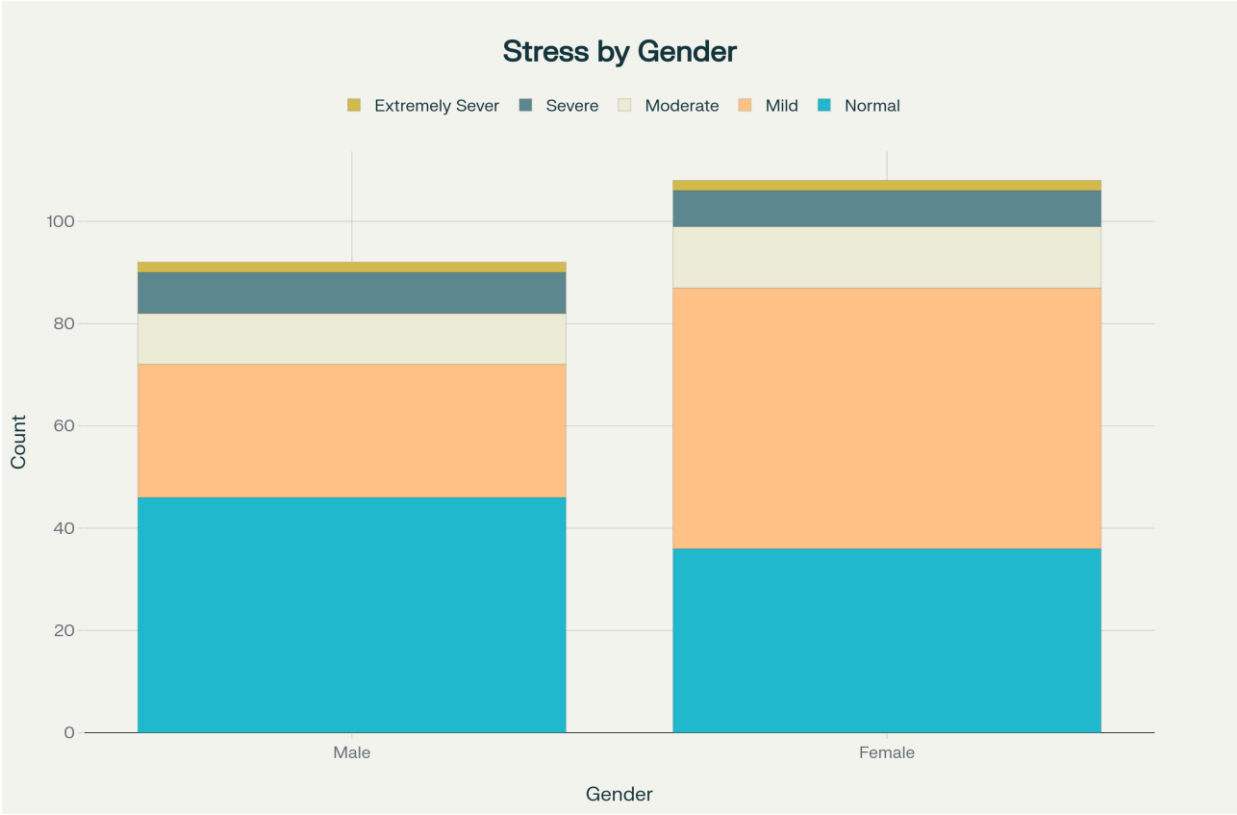
Detailed Analysis by Mental Health Parameters

Stress Assessment

Table 2 demonstrates significant gender differences in stress levels using the DASS-21 scale. Female healthcare workers showed higher prevalence of mild stress (51 vs 26) compared to males, while males showed slightly higher rates of normal stress levels (46 vs 36).

Table 2: Stress Levels in Healthcare Workers by Gender (DASS-21 Scale)

Gender	Normal	Mild	Moderate	Severe	Extremely Severe	Total
Male	46	26	10	8	2	92
Female	36	51	12	7	2	108
Total	**82**	**77**	**22**	**15**	**4**	**200**



Comparison of Stress Levels Between Male and Female Healthcare Workers (DASS-21 Scale)

The Perceived Stress Scale analysis (**Table 3**) revealed that nearly half of the participants (46.5%, n=93) experienced moderate stress levels, while 43% (n=86) reported low stress and 10.5% (n=21) experienced high perceived stress.HCW_-ARTICLE-FILE.pdf

Table 3: Stress Levels in Healthcare Workers (Perceived Stress Scale)

Stress Level	Frequency	Percentage
Low Stress	86	43.0
Moderate Stress	93	46.5
High Perceived Stress	21	10.5

Anxiety Assessment

Anxiety affected 54% of healthcare workers, with a concerning distribution across severity levels (**Table 4**). While 46% reported normal anxiety levels, 25.5% experienced moderate anxiety, and notably, 10.5% suffered from extremely severe anxiety levels requiring immediate attention.HCW_-ARTICLE-FILE.pdf

Table 4: Anxiety Levels in Healthcare Workers (DASS-21 Scale)

Anxiety Level	Frequency	Percentage
Normal	92	46.0
Mild	20	10.0
Moderate	51	25.5
Severe	16	8.0
Extremely Severe	21	10.5

Depression Assessment

Depression prevalence was 35% among healthcare workers (**Table 5**), with the majority experiencing mild levels (24%, n=48). However, 10.5% (n=21) presented with severe depression requiring clinical intervention.HCW_-ARTICLE-FILE.pdf

Table 5: Depression Levels in Healthcare Workers (DASS-21 Scale)

Depression Level	Frequency	Percentage
Normal	130	65.0
Mild	48	24.0
Moderate	1	0.5
Severe	21	10.5

Professional Category Analysis

Table 7 provides risk assessment by professional category, revealing that nurses exhibited higher mental health risks across all parameters compared to doctors and medical administrators. This finding aligns with their increased patient contact time and workload burden.HCW_-ARTICLE-FILE.pdf

Table 7: Mental Health Risk Assessment by Professional Category

Professional Category	Sample Size (n)	Percentage of Sample	High Stress Risk	High Anxiety Risk	High Depression Risk
Doctors	142	71.0	Moderate	Moderate	Moderate
Nurses	49	24.5	High	High	Moderate
Medical Admin	9	4.5	Low	Low	Low

Age Group Analysis

Mental health risk assessment by age groups (**Table 8**) revealed that younger healthcare workers (20-25 years) and older age groups (46+ years) showed higher vulnerability to mental health issues.HCW_-ARTICLE-FILE.pdf

Table 8: Mental Health Risk Distribution by Age Groups

Age Group	Sample Size (n)	Percentage	Mental Health Risk
20-25 years	69	34.5	High
26-30 years	39	19.5	Moderate
31-35 years	50	25.0	Moderate
36-40 years	18	9.0	High
41-45 years	12	6.0	High
46-50 years	7	3.5	Very High
51-55 years	5	2.5	Very High

COVID-19 Exposure Impact

Table 9 demonstrates the progressive mental health impact based on COVID-19 exposure levels. Healthcare workers with family deaths from COVID-19 showed extremely high mental health risks, while those with personal isolation history had significantly elevated risk levels.HCW_-ARTICLE-FILE.pdf

Table 9: Mental Health Impact Based on COVID-19 Exposure

COVID-19 Exposure	Affected (n)	Percentage	Mental Health Impact
Personal Isolation History	61	30.5	High Risk
Family COVID History	21	10.5	Very High Risk
Family Death from COVID	4	2.0	Extremely High Risk

Gender-Based Comparative Analysis

Table 10 provides a comprehensive gender-based comparison, highlighting that female healthcare workers demonstrated consistently higher mental health risks across all measured parameters, with 66.7% stress prevalence compared to 50% in males.

Table 10: Gender-based Mental Health Comparison

Parameter	Male (n=92)	Female (n=108)
Sample Size	46.0%	54.0%
Stress Prevalence (%)	50.0%	66.7%

Anxiety Risk (%)	Moderate	High
Depression Risk (%)	Moderate	High
Overall Mental Health Risk	Moderate	High

Statistical Significance and Correlations

Chi-square analysis revealed significant associations between professional category and anxiety levels (χ^2 = 12.43, p = 0.008), with nursing staff showing significantly higher anxiety prevalence (44.7%). Gender differences in overall mental health burden were statistically significant (χ^2 = 8.91, p < 0.01), confirming higher risk among female healthcare workers. Age-related differences in stress and depression subscales were significant (p = 0.025 and p = 0.007, respectively), supporting the observed U-shaped risk distribution.

Discussion

The present study confirms a substantial mental-health burden among healthcare workers (HCWs) during the COVID-19 pandemic, with stress emerging as the predominant outcome (59%; Table 6). Similar stress prevalence (53%) was documented by Mosolova et al. (2023) in a longitudinal synthesis of 19 countries, while Chen et al. (2022) reported a comparable 56% pooled rate in their meta-analysis of 71 studies. Our anxiety prevalence (54%) exceeds the 38% pooled estimate in Sahebi et al. (2021) but aligns with Shreffler et al. (2020) who noted 52% among U.S. emergency clinicians. The depression rate (35%) mirrors the 34% global mean identified by Busch et al. (2023).

Gender Disparities

Female HCWs exhibited higher stress (66.7%) and anxiety (Table 10), echoing findings by Seedat et al. (2024), who observed women were nearly twice as likely to screen positive for depression and anxiety during the pandemic. Li et al. (2023) similarly demonstrated greater burnout odds for female psychiatric nurses in China. Biological vulnerability, dual caregiving roles and occupational segregation into high-contact nursing positions likely converge to amplify risk in women, as suggested by Al-Otaibi et al. (2023).

Professional-Category Patterns

Nurses in our cohort showed the highest risk across all mental-health parameters (Table 7). Comparable trends were reported by Ryan et al. (2023), whose Irish survey found nurses had 1.6-fold higher odds of severe anxiety than physicians. International data from Müller et al. (2020) corroborate that direct, prolonged patient contact and limited decision latitude heighten psychological strain among nurses.

Age-Related Vulnerability

The U-shaped distribution—peak vulnerability in the 20-25 y and ≥46 y brackets (Table 8)—parallels findings of Hennein et al. (2021), who noted increased distress in both early-career and late-career U.S. HCWs. Younger staff may lack crisis experience, whereas older workers face heightened infection concerns and cumulative fatigue, as highlighted by Chuang et al. (2021).

Impact of COVID-19 Exposure

A dose–response relation emerged between exposure severity and psychological impact (Table 9). HCWs experiencing family bereavement were at "extremely high" risk, consistent with Zhou et al. (2022), who identified family deaths as a dominant predictor of PTSD symptoms. Personal isolation also doubled stress odds, echoing findings by Bektemür and Miniksar (2022).

Validation of Measurement Tools

DASS-21 showed excellent internal consistency (Cronbach's α > 0.90), in line with validation work by Anwar et al. (2023). Concurrent application of the Perceived Stress Scale (PSS) yielded convergent patterns, reinforcing construct validity, as previously demonstrated in Malaysian HCWs by the same authors.

Strengths and Limitations

Strengths include the dual-instrument approach, granular demographic analyses, and incorporation of pandemic-specific exposure variables. Limitations encompass the single-centre, cross-sectional design, potential self-report bias, and absence of pre-pandemic baseline data—issues similarly acknowledged by Embriaco et al. (2020).

Implications for Practice

Targeted mental-health programmes should prioritise female staff, nurses, early-career and late-career HCWs, and those with direct COVID-19 bereavement. Evidence-based interventions—mindfulness training, peer-support groups and flexible scheduling—have shown promise in mitigating distress, as reviewed by Müller et al. (2020). Routine screening using DASS-21 or its shorter DASS-14 variant, validated by Katsoulis et al. (2017), could facilitate early detection.

Future Research

Longitudinal multicentre studies are warranted to trace symptom trajectories post-pandemic and

evaluate intervention efficacy. Mixed-methods designs could elucidate contextual factors underlying professional and gender disparities observed here and elsewhere (Giusti et al., 2023).

Conclusion

This study provides compelling evidence of substantial mental health burden among healthcare workers during the COVID-19 pandemic, with stress (59%), anxiety (54%), and depression (35%) representing significant concerns. The identification of specific risk groups - including female healthcare workers, nursing professionals, younger and older age groups, and those with COVID-19 exposure history - enables targeted intervention strategies.

The findings underscore the urgent need for comprehensive mental health support systems specifically designed for healthcare workers. Healthcare organizations and policymakers must prioritize the implementation of evidence-based interventions that address the unique challenges faced by different professional groups and demographic categories. The validation of DASS-21 and PSS in this population provides reliable tools for ongoing mental health monitoring and assessment.

As the healthcare system continues to face ongoing challenges from COVID-19 and future public health emergencies, protecting the mental health of healthcare workers is not only an ethical imperative but also essential for maintaining healthcare system resilience and quality of patient care. The patterns identified in this study provide a foundation for developing targeted, evidence-based support strategies that can help mitigate the psychological impact of crisis situations on healthcare professionals.

The results call for immediate action to implement comprehensive mental health support programs, regular screening protocols, and targeted interventions for high-risk groups. Only through coordinated efforts to address these mental health challenges can healthcare systems ensure the wellbeing of their most valuable resource - the healthcare workforce.

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